


FLOOD RAPID ASSESSMENT MODEL (F-RAM)

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DWR

- URS HAS DEVELOPED A FLOOD RAPID APPRAISAL METHOD (F-RAM) FOR THE CALIFORNIA DEPARTMENT OF WATER RESOURCES (DWR) TO ASSESS THE BENEFITS (REDUCTION IN FLOOD DAMAGES) OF THEIR LEVEE REPAIR PROGRAM AND PRIORITIZE THEIR FUTURE REPAIR PROGRAM.

- The F-RAM is a method for the rapid and consistent evaluation of floodplain management measures in a benefit-cost analysis (BCA) framework.

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ASSETS CONSIDERED IN F-RAM:

- Residential Buildings
 - Commercial Buildings
 - Agriculture
 - Roads
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SUBSEQUENT CHANGES MADE TO THE F-RAM :

- SEPARATING STRUCTURAL AND CONTENTS DAMAGE ASSESSMENTS FOR INDUSTRIAL AND COMMERCIAL BUILDINGS (PREVIOUSLY THESE BUILDING LOSSES WERE COMBINED)
- INCLUDING IN THE F-RAM THE OPTION TO USE HAZUS DATA WHERE SUCH DATA ARE AVAILABLE
- INCLUDING IN THE F-RAM THE CAPABILITY TO ASSESS BOTH "POTENTIAL" FLOOD DAMAGES AND "ACTUAL" FLOOD DAMAGES

Proposed ratios of actual:potential damages

Warning time	Experienced community	Inexperienced community
Less than 2 hour	0.8	0.9
2 to 12 hours	Linear reduction from 0.8 at 2 hours to 0.4 at 12 hours	0.8
Greater than 12 hours	0.4	0.7

AGRICULTURAL DAMAGES:


PRODUCT	Weighted Ave Annual Damages	Establishment Costs	Land Cleanup & Rehab	Total (<5days)	Total (>5days)	% Change <5days
Corn	\$48	\$0	\$246	\$293	\$293	20%
Rice	\$227	\$0	\$243	\$471	\$471	27%
Walnuts	\$585	\$5,284	\$243	\$828	\$6,112	9%
Almonds	\$1,618	\$3,514	\$243	\$1,862	\$5,376	12%
Cotton	\$301	\$0	\$246	\$547	\$547	-14%
Tomatoes	\$1,015	\$0	\$235	\$1,250	\$1,250	13%
Wine Grapes	\$3,241	\$3,240	\$235	\$3,476	\$6,716	16%
Alfalfa	\$250	\$246	\$243	\$493	\$739	-2%
Pasture	(\$15)	\$82	\$272	\$257	\$339	25%
Safflower	\$164	\$0	\$241	\$405	\$405	-6%
Sugar Beets	\$313	\$0	\$262	\$575	\$575	-6%
Beans	\$111	\$0	\$246	\$356	\$356	14%
Other			\$246	\$246	\$246	

Data updated from USACE 1999 Comprehensive Study

ROADS AND INFRASTRUCTURE

Type of Road	Cost of Damages \$/mile
• Cost per mile of highway inundated	• \$250,000
• Cost per mile of major road inundated	• \$100,000
• Cost per mile of minor road inundated	• \$30,000
• Cost per mile of gravel road inundated	• \$10,000


ESTIMATING INDIRECT COSTS ASSOCIATED WITH FLOODING:

- Emergency response including food and accommodation
 - Health impacts
 - Disruption of employment, commerce, transport and communication
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COSTS AS A PERCENTAGE OF DIRECT DAMAGES

Type of Damage	Percentage of Direct Damages
Residential Buildings	25%
Industrial/Commercial Buildings	25%
Roads	50%

CERTAIN OTHER ESTIMATES OF DAMAGE ARE BEYOND THE SCOPE OF THIS ANALYSIS !

- Loss of business to commercial and industrial enterprises
 - Costs of flooding disruption to utilities (gas, electricity, water, sewerage, telecommunications and postal services)
 - Potential for loss of life
 - Disruption of tourism
 - Costs imposed on public services, such as education and health services
 - Damages to public gardens, and recreation assets
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LIMITATIONS OF THE F-RAM TOOL:

- F-RAM is an economic model and should not be the only factor driving the investment decision.
- F-RAM is a relative tool rather than absolute tool.
- Considerations such as public safety, equity, and other factors, must also be weighed up. output of this model should therefore form only one component of the overall decision-making process